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10/532,099	04/21/2005	Moshe Ben-Chorin	P-5490-US	4040
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PEARL COHEN ZEDEK, LLP 1500 BROADWAY 12TH FLOOR NEW YORK, NY 10036			AMIN, JWALANT B	
			ART UNIT	PAPER NUMBER
			2628	
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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/532,099	Applicant(s) BEN-CHORIN ET AL.	
	Examiner Jwalant Amin	Art Unit 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language. .

2. Claims 1-3, 6-13, 15-16, 22-24, 26-32, 34-36 and 38-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Taniguchi et al. (US 6,366,291 B1; hereinafter referred to as Taniguchi).

3. Regarding claims 1 and 32, Taniguchi teaches a method of selectively adjusting colors (R, G and B display signals) displayed by a color display (color monitor), the method comprising adjusting an intensity value of a first primary color component of a pixel (pixels are inherent to a color image displayed on a color monitor; the intensity of red, green or blue primary color is adjusted using equation 1) based, at least in part, on an intensity value of a second primary color component of said pixel (the intensity of red primary color is adjusted using the intensity values of green and blue primaries) (col. 7 lines 41- 67, equation 1, col. 8 lines 16-62).

4. Regarding claim 2, Taniguchi teaches pixel comprising three or more primary color components (RGB color signals; col. 7 lines 41-44).

5. Regarding claim 3, Taniguchi teaches that said adjusting comprises adjusting the intensity value of said primary color component based on intensity values of all said three primary color components (the intensity value of red is adjusted based on the intensity values of all three primaries red, green and blue; equation 1, col. 8).

6. Regarding claim 6, Taniguchi teaches performing said adjusting (reproducing) for a plurality of pixels of a color image (pixels are inherent to color patches) to be displayed by said color display (color monitor) (col. 9 lines 52-55).

7. Regarding claim 7, Taniguchi teaches adjusting comprises calculating an adjusted intensity value ( $r'$ ,  $g'$ ,  $b'$  are the adjusted intensities values of the primary colors red, green and blue) for said primary color component using a conversion operator (inverse matrix) dependent on one or more of the intensity values of the primary color components (equation 1 represents the intensity values of the primary color components as a 3x3 matrix) (col. 7 lines 64-67, col. 8 lines 1-8, col. 13 lines 41-46).

8. Regarding claim 8, Taniguchi teaches said conversion operator comprises a conversion inverse matrix (inverse matrix) to convert the intensity values of said primary color components in an absolute data format (the values displayed by the 3x3 matrix in equation 1 represents the intensity values of primary color components in an absolute data format) into corresponding values in a device-dependent data format (XYZ) (equation 1, col. 8 lines 4-8, col. 13 lines 41-46).

9. Regarding claim 9, Taniguchi teaches one or more elements of said conversion inverse matrix are dependent on one or more of the intensity values of said primary

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color components (equation 1;  $r'$  is dependent on the intensity values of primary colors red, green and blue) (equation 1, col. 8 lines 4-8, col. 13 lines 41-46).

10. Regarding claim 10, Taniguchi teaches conversion inverse matrix corresponds to an inverse of a direct conversion matrix (matrix expressed by equation 8) (col. 1 lines 4-8, col. 13 lines 19-46).

11. Regarding claim 11, Taniguchi teaches said direct conversion matrix comprises elements (values of the 3x3 matrix of equation 8) dependent on the intensity values of said primary color components (values of the 3x3 matrix in equation 8 correspond to red, green and blue primary in the color monitor) (col. 13 lines 19-40).

12. Regarding claim 12, Taniguchi teaches determining an initial conversion operator (determining the ratio of maximum luminances of red, green and blue in actual color monitor when the white of D50 is used as white corresponds to initial conversion operator; equation 3 col. 13; matrix of equation 8); and converting the intensity values of said primary color components (red, green and blue represented by values  $r'$ ,  $g'$  and  $b'$  in the actual color monitor) into initial converted intensity values (intensity values of XYZ) using said initial conversion operator (matrix of equation 8) (col. 13 lines 3-35)..

13. Regarding claim 13, Taniguchi teaches determining said initial conversion operator comprises selecting one or more initial intensity values (the matrix is obtained for white of D50, and thus if a white for another color temperature is used then it would select different intensity values of red, green and blue of the actual color monitor) (col. 13 lines 3-18).

14. Regarding claim 15, Taniguchi teaches adjusting said conversion operator (the matrix of XYZ values in actual color monitor is adjusted to the virtual color space represented by x, y and Y values of the colors red, green and blue) based on said converted values (values  $L^*$ ,  $a^*$  and  $b^*$  in the uniform color space are the corresponding values of red, green and blue in the actual color monitor) to provide an adjusted conversion operator (matrix of equation 9 is the adjusted conversion operator); and converting the intensity values of said primary components ( $r'g'b'$  represent the primary components in virtual color space) using said adjusted conversion to provide adjusted converted intensity values (XYZ values in equation 9 represent the adjusted converted intensity values in a virtual color space) (col. 13, col. 14).

15. Regarding claim 16, Taniguchi teaches adjusting comprises calculating elements (XYZ values in equation 9) of an adjusted direct conversion matrix based on said converted values (values represented by the 3x3 matrix in equation 9 represents adjusted direct conversion matrix based on converted values  $L^*$ ,  $a^*$  and  $b^*$  corresponding to x, y and Y values with respect to the colors expressed by the red, green and blue in virtual color space); and constructing an inverse matrix (inverse matrix represented by equation 10) by inverting said adjusted direct conversion matrix (matrix represented by equation 9) (col. 14 lines 28-50).

16. Regarding claim 22, Taniguchi teaches said adjusting comprises obtaining one or more device-dependent intensity values (XYZ values in equation 9) corresponding to one or more imaginary (virtual) intensity values ( $r'g'b'$  of equation 9 representing values in virtual color monitor) of said primary color components ( $r'g'b'$  corresponds to red,

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green and blue); and combining one or more of said device dependent intensity values (equation 4-7 uses combination of device dependent intensity values XYZ) (col. 13 equations 4-7, col. 14 lines 34-50).

17. Regarding claim 23, Taniguchi teaches said imaginary intensity values ( $r'g'b'$  in equation 9) comprise the intensity values of said primary color components ( $r'g'b'$  represent intensity values of primary colors red, green and blue in virtual color space) (col. 14 lines 41-50).

18. Regarding claims 24, Taniguchi teaches obtaining said imaginary intensity values ( $r'g'b'$  in equation 10) by applying a predefined conversion operator (3x3 matrix of equation 10) to input intensity values (values in 3x3 matrix corresponding to red, green and blue) of said primary color components (equation 10, col. 14).

19. Regarding claim 26, Taniguchi teaches each of said device dependent values (XYZ) correspond to one of said primary color components ( $r'g'b'$ ) (equation 9, col. 14; in equation 9, the value X corresponds to all three values  $r'$ ,  $g'$  and  $b'$ ).

20. Regarding claim 27, Taniguchi teaches said combining comprises combining said device-dependent values based on said primary color components (equation 9, col. 14; in equation 9, the value X corresponds to the combination of all three values  $r'$ ,  $g'$  and  $b'$ ).

21. Regarding claim 28, Taniguchi teaches combining comprises calculating a sum of the device dependent values corresponding to each of said primary color components (equation 9, col. 14).

22. Regarding claim 29, Taniguchi teaches adding (equation 10) a sub-adjustment value (individual elements representing the intensity values of the 3x3 matrix in equation 10) to a first imaginary intensity value ( $r'$ ) based on a second imaginary intensity value ( $g'$ ), said first and second imaginary intensity values corresponding to said first and second primary color components ( $r'$  corresponds to red and  $g'$  corresponds to green primary colors), respectively (equation 10, col. 14).
23. Regarding claim 30, the statements presented above, with respect to claims 29 and 23, are incorporated herein.
24. Regarding claim 31, the statements presented above, with respect to claims 29 and 24, are incorporated herein.
25. Regarding claim 34, the statements presented above, with respect to claims 32 and 22, are incorporated herein.
26. Regarding claim 35, the statements presented above, with respect to claims 32 and 23, are incorporated herein.
27. Regarding claim 36, the statements presented above, with respect to claims 32 and 24, are incorporated herein.
28. Regarding claim 38, the statements presented above, with respect to claims 32 and 29, are incorporated herein.
29. Regarding claim 39, the statements presented above, with respect to claims 32 and 23, are incorporated herein.
30. Regarding claim 40, the statements presented above, with respect to claims 32 and 24, are incorporated herein.



***Claim Rejections - 35 USC § 103***

31. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

32. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi.

33. Regarding claim 18, Taniguchi teaches all of the claimed limitations as stated above, except that he does not explicitly disclose comparing said initial converted intensity values (XYZ values in actual color space) and said adjusted converted intensity values (XYZ values in virtual color space). However, Taniguchi does an indirect comparison between the color conversion of XYZ to r'g'b' and from r'g'b' to RGB in actual color space and the color conversion of XYZ to r'g'b' and from r'g'b' to RGB in virtual color space (col. 9 lines 5-15, col. 15 lines 10-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time of present invention to compare the initial converted intensity values and the adjusted converted intensity values as taught by Taniguchi because this shows that the adjusted converted intensity values gives a better resolution as the color conversion from XYZ to r'g'b' and from r'g'b' to RGB in virtual color space prevents from losing the information regarding the desired color which is lost by color conversion of XYZ to r'g'b' and from r'g'b' to RGB in actual color

space resulting in abnormal tone or a change in hue (col. 9 lines 5-15, col. 15 lines 10-21).

34. Regarding claim 19, Taniguchi teaches re-initializing said conversion operator according to said adjusted conversion operator (col. 15 lines 4-9; XYZ to r'g'b' conversion uses the matrix of equation 10 in virtual color space instead of using the matrix of equation 1 in actual color space, which corresponds to re-initializing said conversion operator according to said adjusted conversion operator).

35. Regarding claim 20, Taniguchi teaches re-initializing said conversion operator comprises substituting elements of said initial conversion operator with respective values of said adjusted conversion operator (col. 15 lines 4-9; XYZ to r'g'b' conversion uses the matrix of equation 10 in virtual color space instead of using the matrix of equation 1 in actual color space, which corresponds to re-initializing said conversion operator by replacing the elements of said initial conversion matrix in actual color space with the elements of said adjusted conversion matrix in virtual color space).

36. Regarding claim 21, Taniguchi discloses all of the claimed limitations as stated above, except that he does not explicitly teach to repeat said adjusting, said converting based on said adjusted conversion operator, and said re-initializing, until a pre-determined difference between said initial converted intensity values and said adjusted converted intensity values is achieved. However, he describes to select vertexes R5, G5 and B5 representing virtual chromaticity coordinates in virtual color space having the same hues as those of the actual chromaticity coordinates of actual color space R0, G0 and B0, and converting the XYZ values to r'g'b' based on the relationship of color

conversion obtained for the virtual color monitor enabling the resulting  $r'$ ,  $g'$  and  $b'$  to be within the color range of 0 to 1 of reproducible gamut in virtual color monitor (col. 10 lines 63-67, col. 11, col. 12 lines 1-51, col. 15 lines 10-21; though Taniguchi does not teach to repeat the procedure but it would be possible to repeat the procedure by selecting the vertexes with less than 5% higher saturations than those of the actual chromaticity coordinates in actual color space, and gradually keep on selecting the vertexes with higher saturations until they result in the chromaticity coordinates in virtual color space that would produce the  $r'g'b'$  values in the range 0 to 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of present invention to repeat the procedure of Taniguchi to obtain the vertexes in virtual color space to produce the  $r'g'b'$  values in the range of 0 to 1 because such procedure will ensure that the very first vertexes in virtual color space with saturations higher than the vertexes of actual chromaticity coordinates in actual color space are obtained as this will keep the increase in the reproducible gamut range to minimum.

37. Claims 4-5 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi, and further in view of Childs et al. (GB 2,282,928 A; hereinafter referred to as Childs).

38. Regarding claim 4, Taniguchi discloses all of the claimed limitations as stated above, except that he does not explicitly teach three or more primary color components comprise four or more primary color components. However, Childs teaches to use four or more display primaries (Fig. 3 shows two green primaries besides red and blue).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time of present invention to use four or more display primaries as taught by Childs into the method of Taniguchi because using four or more primaries will provide a wider color gamut (pg. 1 paragraph 2).

39. Regarding claim 5, Taniguchi discloses all of the claimed limitations as stated above, except that he does not explicitly teach adjusting comprises adjusting the intensity value of said first primary color component based on intensity values of one or more of said four or more primary color components. However, Childs teaches to adjust the intensity values of a first primary color based on intensity values of one or more primary colors (equation 3i, pg. 11; P1, P2, P3 and P4 corresponds to four or more primary color components). Therefore, it would have been obvious to one of ordinary skill in the art at the time of present invention to adjust intensity of a first primary color based on intensity values of all other primary colors as taught by Childs and use it into the method of Taniguchi because it results in simplifying some of the complexity of the decoder used for a four primary display device from a three primary transmission system (pg. 12 paragraph 3, pg. 15 lines 1-3).

40. Regarding claim 33, Taniguchi discloses all of the claimed limitations as stated above, except that he does not explicitly teach a driver to receive said adjusted intensity value from said color adjustment unit and to drive a color display device according to said adjusted intensity value. However, Childs teaches to determine display drive signals (driver to drive a color display device) from a coded transmission signal (adjusted intensity value) from a three primary transmission system (primary color

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components in color adjustment unit) (Fig. 4, pg. 12 paragraph 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of present invention to drive the color display device as taught by Childs and use it into the method of Taniguchi because the gain control of each drive signal is used to set up the procedure for white balancing (pg. 12 last paragraph).

41. Claims 17, 25, 37 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi, and further in view of Lin (US 6,160,644).

42. Regarding claim 17, Taniguchi discloses all of the claimed limitations as stated above, except that he does not explicitly teach using one or more look up tables (input LUT) to associate each of said converted values (scanned RGB values) with a set of device dependent XYZ values (XYZ values); and constructing said adjusted direct conversion matrix (input LUT comprising table entries is used as a direct conversion matrix) using said XYZ values. However, Lin teaches exactly the same (col. 3 lines 1-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of present invention to use look up tables for converting scanned RGB values into device-dependent XYZ values as taught by Lin and use it into the method of Taniguchi because look up tables helps transformation of output device in-gamut colors using interpolation (col. 3 lines 31-33).

43. Regarding claim 25, the statements presented above, with respect to claims 22 and 17, are incorporated herein.

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44. Regarding claim 37, Taniguchi discloses all of the claimed limitations as stated above, except that he does not explicitly teach said logic unit comprises one or more memory units to store one or more look up tables to associate each of said one or more imaginary intensity values with a respective plurality of said device values. However, Lin teaches to use only enough memory to store one transformation LUT (col. 15 lines 1-4; please refer to rejection of claim 17 for further arguments). Therefore, it would have been obvious for one of ordinary skill in art at the time of present invention to store only one transformation lookup tables in memory as taught by Lin and use it into the method of Taniguchi because storing only one transformation LUT in memory will save considerable memory otherwise required to store the transformation LUT for each input device (col. 14 lines 29-32, col. 15 lines 3-4).

45. Regarding claim 41, the statements presented above, with respect to claims 38 and 37, are incorporated herein.

46. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi, and further in view of Tanner et al. (US 6,496,160 B1; hereinafter referred to as Tanner).

47. Regarding claim 14, Taniguchi teaches said initial intensity values (intensity of a given pixel) are selected according to intensity values of primary color components of a neighbor pixel adjacent (adjacent pixels) to said pixel. However, Tanner teaches to calculate the intensity of a given pixel from adjacent pixels (col. 4 lines 12-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of

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present invention to calculate the intensity of a given pixel as taught by Tanner and use it into the method of Taniguchi because this results in smoother appearing lines and edges of objects to be displayed on the raster display unit (col. 4 lines 14-15).

48. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jwalant Amin whose telephone number is 571-272-2455. The examiner can normally be reached on 9:30 a.m. - 6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 571-272-7653. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

\*\*\* J.A. 8/3/06



KEE M. TUNG  
SUPERVISORY PATENT EXAMINER